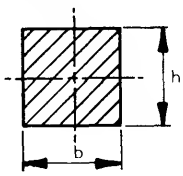
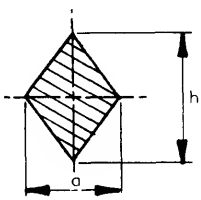
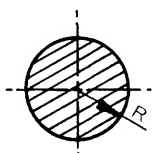
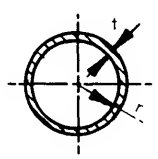
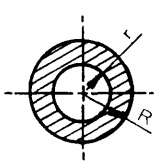
Table 18.1 Bending Moment Ratios for Typical Beam Cross Sections

	$\frac{M_p}{M_y} = 1.5$	$M_y = \frac{bh^2 S_y}{6}$
	$\frac{M_p}{M_y} = 2.0$	$M_y = \frac{ah^2 S_y}{24}$
	$\frac{M_p}{M_y} = 1.698$	$M_y = \frac{\pi R^3 S_y}{4}$
	$\frac{M_p}{M_y} = 1.274\left(1 + \frac{t}{r}\right)$	$M_y = \frac{2\pi r^3 t S_y}{r + t}$
	$\frac{M_p}{M_y} = 1.698\frac{R(R^3 + r^3)}{(R^4 - r^4)}$	$M_y = \frac{\pi(R^4 - r^4)S_y}{4R}$

SYMBOLS

a	Width of diamond shape, in. (mm)
b	Width of rectangular cross section, in. (mm)
C	Distance from neutral axis to outer fiber, in. (mm)
h	Depth of beam section, in. (mm)
I	Moment of inertia, in.^{4} (mm^4)
M_p	Plastic bending moment, lb-in. (N-mm)
M_y	Bending moment at yield, lb-in. (N-mm)
R	Outer radius, in. (mm)
r	Inner radius, in. (mm)
S_y	Yield strength, psi (N/mm^2)
t	Wall thickness, in. (mm).